

SEQUENCE LISTING

(1) GENERAL INFORMATION:

- (i) APPLICANT: Bruce L. Rogers et al.i
- (ii) TITLE OF INVENTION: A HUMAN T CELL REACTIVE FELINE PROTEIN
(TFRP) ISOLATED FROM HOUSE DUST AND USES THEREFOR
- (iii) NUMBER OF SEQUENCES: 103
- (iv) CORRESPONDENCE ADDRESS:
 - (A) ADDRESSEE: LAHIVE & COCKFIELD, LLP
 - (B) STREET: 28 State Street
 - (C) CITY: Boston
 - (D) STATE: Massachusetts
 - (E) COUNTRY: USA
 - (F) ZIP: 02109
- (v) COMPUTER READABLE FORM:
 - (A) MEDIUM TYPE: Floppy disk
 - (B) COMPUTER: IBM PC compatible
 - (C) OPERATING SYSTEM: PC-DOS/MS-DOS
 - (D) SOFTWARE: PatentIn Release #1.0, Version #1.25
- (vi) CURRENT APPLICATION DATA:
 - (A) APPLICATION NUMBER:
 - (B) FILING DATE:
- (vii) PRIOR APPLICATION DATA:
 - (A) APPLICATION NUMBER: US 08/431,184
 - (B) FILING DATE: 27-APR-1995
- (vii) PRIOR APPLICATION DATA:
 - (A) APPLICATION NUMBER: US 08/430,014
 - (B) FILING DATE: 27-APR-1995
- (vii) PRIOR APPLICATION DATA:
 - (A) APPLICATION NUMBER: US 08/300,928
 - (B) FILING DATE: 02-SEPT-1994
- (viii) ATTORNEY/AGENT INFORMATION:
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 - (B) REGISTRATION NUMBER: 36,207
 - (C) REFERENCE/DOCKET NUMBER: IMI-044DV3CN
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(2) INFORMATION FOR SEQ ID NO:1:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 418 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

(A) NAME/KEY: CDS

(B) LOCATION: 2..283

(ix) FEATURE:

(A) NAME/KEY: mat_peptide

(B) LOCATION: 74..283

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

C TGC ATC ATG AAG GGG GCT CGT GTT CTC GTG CTT CTC TGG GCT GCC	46
Cys Ile Met Lys Gly Ala Arg Val Leu Val Leu Leu Trp Ala Ala	
-24 -20 -15 -10	
TTG CTC TTG ATC TGG GGT GGA AAT TGT GAA ATT TGC CCA GCC GTG AAG	94
Leu Leu Leu Ile Trp Gly Gly Asn Cys Glu Ile Cys Pro Ala Val Lys	
-5 1 5	
AGG GAT GTT GAC CTA TTC CTG ACG GGA ACC CCC GAC GAA TAT GTT GAG	142
Arg Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val Glu	
10 15 20	
CAA GTG GCA CAA TAC AAA GCA CTA CCT GTA GTA TTG GAA AAT GCC AGA	190
Gln Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg	
25 30 35	
ATA CTG AAG AAC TGC GTT GAT GCA AAA ATG ACA GAA GAG GAT AAG GAG	238
Ile Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu	
40 45 50 55	
AAT GCT CTC AGC TTG CTG GAC AAA ATA TAC ACA AGT CCT CTG TGT	283
Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Cys	
60 65 70	
TAAAGGAGCC ATCACTGCCA GGAGCCCTAA GGAAGCCACT GAACTGATCA CTAAGTAGTC	343
TCAGCAGCCT GCCATGTCCA GGTGTCTTAC TAGAGGATTC CAGCAATAAA AGCCTGGCAA	403
TTCAAACAAA AAAAA	418

(2) INFORMATION FOR SEQ ID NO:2:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 94 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

Cys Ile Met Lys Gly Ala Arg Val Leu Val Leu Leu Trp Ala Ala Leu
 -24 -20 -15 -10
 Leu Leu Ile Trp Gly Gly Asn Cys Glu Ile Cys Pro Ala Val Lys Arg
 -5 1 5
 Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val Glu Gln
 10 15 20
 Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile
 25 30 35 40
 Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu Asn
 45 50 55
 Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Cys
 60 65 70

(2) INFORMATION FOR SEQ ID NO:3:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 420 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 2..289

(ix) FEATURE:

- (A) NAME/KEY: mat_peptide
- (B) LOCATION: 80..289

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

G GCC TGG CGG TGC TCC TGG AAA AGG ATG TTA GAC GCA GCC CTC CCA	46
Ala Trp Arg Cys Ser Trp Lys Arg Met Leu Asp Ala Ala Leu Pro	
-26 -25 -20 -15	
CCC TGC CCT ACT GTT GCG GCC ACA GCA GAT TGT GAA ATT TGC CCA GCC	94
Pro Cys Pro Thr Val Ala Ala Thr Ala Asp Cys Glu Ile Cys Pro Ala	
-10 -5 1 5	
GTG AAG AGG GAT GTT GAC CTA TTC CTG ACG GGA ACC CCC GAC GAA TAT	142
Val Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr	
10 15 20	
GTT GAG CAA GTG GCA CAA TAC AAA GCA CTA CCT GTA GTA TTG GAA AAT	190
Val Glu Gln Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn	
25 30 35	
GCC AGA ATA CTG AAG AAC TGC GTT GAT GCA AAA ATG ACA GAA GAG GAT	238

Ala Arg Ile Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp
40 45 50

AAG GAG AAT GCT CTC AGC TTG CTG GAC AAA ATA TAC ACA AGT CCT CTG 286
Lys Glu Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu
55 60 65

TGT TAAAGGAGCC ATCACTGCCA GGAGCCCTAA GGAAGCCACT GAACTGATCA 339
Cys
70

CTAAGTAGTC TCAGCAGCCT GCCATGTCCA GGTGTCTTAC TAGAGGATTC CAGCAATAAA 399

AGCCTTGCAA TTCAAACAAA A 420

(2) INFORMATION FOR SEQ ID NO:4:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 96 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

Ala Trp Arg Cys Ser Trp Lys Arg Met Leu Asp Ala Ala Leu Pro Pro
-26 -25 -20 -15

Cys Pro Thr Val Ala Ala Thr Ala Asp Cys Glu Ile Cys Pro Ala Val
-10 -5 1 5

Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val
10 15 20

Glu Gln Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn Ala
25 30 35

Arg Ile Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys
40 45 50

Glu Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Cys
55 60 65 70

(2) INFORMATION FOR SEQ ID NO:5:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 476 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

(A) NAME/KEY: CDS
(B) LOCATION: 2..334

(ix) FEATURE:

(A) NAME/KEY: mat_peptide
(B) LOCATION: 59..334

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

T GAC ACG ATG AGG GGG GCA CTG CTT GTG CTG GCA TTG CTG GTG ACC	46
Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr	
-19 -15 -10 -5	
CAA GCG CTG GGC GTC AAG ATG GCG GAA ACT TGC CCC ATT TTT TAT GAC	94
Gln Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp	
1 5 10	
GTC TTT TTT GCG GTG GCC AAT GGA AAT GAA TTA CTG TTG GAC TTG TCC	142
Val Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser	
15 20 25	
CTC ACA AAA GTC AAT GCT ACT GAA CCA GAG AGA ACA GCC ATG AAA AAA	190
Leu Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys	
30 35 40	
ATC CAG GAT TGC TAC GTG GAG AAC GGA CTC ATA TCC AGG GTC TTG GAT	238
Ile Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp	
45 50 55 60	
GGA CTA GTC ATG ACA ACC ATC AGC TCC AGC AAA GAT TGC ATG GGT GAA	286
Gly Leu Val Met Thr Thr Ile Ser Ser Ser Lys Asp Cys Met Gly Glu	
65 70 75	
GCA GTT CAG AAC ACC GTA GAA GAT CTC AAG CTG AAC ACT TTG GGG AGA	334
Ala Val Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg	
80 85 90	
TGAATCTTTG CCACTGATGC CCCTTCTGAG CCCATCCTC CTGCCCTGTT CTTTACACCT	394
AAAGCTGGAA TCCAGACACC TGTCTCACC TAATTCATC TCAATCAGGC TGACTAGAAT	454
AAAATAACTG CATCTTAAAA AA	476

(2) INFORMATION FOR SEQ ID NO:6:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 111 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln
-19 -15 -10 -5

Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val
1 5 10

Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
15 20 25

Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile
30 35 40 45

Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
50 55 60

Leu Val Met Thr Thr Ile Ser Ser Ser Lys Asp Cys Met Gly Glu Ala
65 70 75

Val Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
80 85 90

(2) INFORMATION FOR SEQ ID NO:7:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 469 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..327

(ix) FEATURE:

- (A) NAME/KEY: mat_peptide
- (B) LOCATION: 59..327

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

GAC ACG ATG AGG GGG GCA CTG CTT GTG CTG GCA TTG CTG GTG ACC CAA	48
Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln	
-19 -15 -10 -5	
GCG CTG GGC GTC AAG ATG GCG GAG ACG TGC CCC ATT TTT TAT GAC GTC	96
Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val	
1 5 10	
TTT TTT GCG GTG GCC AAT GGA AAT GAA TTA CTG TTG GAC TTG TCC CTC	144
Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu	
15 20 25	
ACA AAA GTC AAT GCT ACT GAA CCA GAG AGA ACA GCC ATG AAA AAA ATC	192
Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile	
30 35 40 45	

CAG GAT TGC TAC GTG GAG AAC GGA CTC ATA TCC AGG GTC TTG GAT GGA	240
Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly	
50 55 60	
CTA GTC ATG ATA GCC ATC AAC GAA TAT TGC ATG GGT GAA GCA GTT CAG	288
Leu Val Met Ile Ala Ile Asn Glu Tyr Cys Met Gly Glu Ala Val Gln	
65 70 75	
AAC ACC GTA GAA GAT CTC AAG CTG AAC ACT TTG GGG AGA TGAATCTTTG	337
Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg	
80 85 90	
CCACTGATGC CCCTTCTGAG CCCCATCCTC CTGTCCTGTT CTTTACACCT AAAGCTGGAA	397
TCCAGACACC TGTCCTCACC TAATTCATC TCAATCAGGC TGACTAGAAT AAAATAACTG	457
CATCTTAAAA AA	469

(2) INFORMATION FOR SEQ ID NO:8:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 109 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln	
-19 -15 -10 -5	
Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val	
1 5 10	
Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu	
15 20 25	
Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile	
30 35 40 45	
Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly	
50 55 60	
Leu Val Met Ile Ala Ile Asn Glu Tyr Cys Met Gly Glu Ala Val Gln	
65 70 75	
Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg	
80 85 90	

(2) INFORMATION FOR SEQ ID NO:9:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 465 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

(A) NAME/KEY: CDS

(B) LOCATION: 1..291

(ix) FEATURE:

(A) NAME/KEY: mat_peptide

(B) LOCATION: 58..291

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

GAC ACG ATG AGG GGG GCA CTG CTT GTG CTG GCA TTG CTG GTG ACC CAA	48
Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln	
-19 -15 -10 -5	
GCG CTG GGC GTC AAG ATG GCG GAG ACG TGC CCC ATT TTT TAT GAC GTC	96
Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val	
1 5 10	
TTT TTT GCG GTG GCC AAT GGA AAT GAA TTA CTG TTG GAC TTG TCC CTC	144
Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu	
15 20 25	
ACA AAA GTC AAT GCT ACT GAA CCA GAG AGA ACA GCC ATG AAA AAA ATC	192
Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile	
30 35 40 45	
CAG GAT TGC TAC GTG GAG AAC GGA CTC ATA TCC AGG GTC TTG GAT GGA	240
Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly	
50 55 60	
CTA GCC ATG CCA TCA ACG AAT ATT GCA TGG GTG AAG CAG TTC AGA ACA	288
Leu Ala Met Pro Ser Thr Asn Ile Ala Trp Val Lys Gln Phe Arg Thr	
65 70 75	
CCG TAGAAGATCT CAAGCTGAAC ACTTTGGGGA GATGAATCTT TGCCACTGAT	341
Pro	
GCCCCTTCTG AGCCCCATCC TCCTGTCCTG TTCTTTACAC CTAAAGCTGG AATCCAGACA	401
CCTGTCCTCA CCTAATTCAC TCTCAATCAG GCTGACTAGA ATAAAATAAC TGCATCTTAA	461
AAAA	465

(2) INFORMATION FOR SEQ ID NO:10:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 97 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln
-19 -15 -10 -5

Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val
1 5 10

Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
15 20 25

Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile
30 35 40 45

Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
50 55 60

Leu Ala Met Pro Ser Thr Asn Ile Ala Trp Val Lys Gln Phe Arg Thr
65 70 75

Pro

(2) INFORMATION FOR SEQ ID NO:11:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 94 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(ix) FEATURE:

(A) NAME/KEY: Protein

(B) LOCATION: 25..94

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

Cys Ile Met His Gly Ala Arg Val Leu Val Leu Leu Trp Ala Ala Leu
-20 -15 -10

Leu Leu Ile Trp Gly Gly Asn Cys Glu Ile Cys Pro Ala Val Lys Arg
-5 1 5

Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val Glu Gln
10 15 20

Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile
25 30 35 40

Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu Asn

Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Cys
 60 65 70

(2) INFORMATION FOR SEQ ID NO:12:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 96 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(ix) FEATURE:

- (A) NAME/KEY: Protein
- (B) LOCATION: 27..96

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

Ala	Trp	Arg	Cys	Ser	Trp	Lys	Arg	Met	Leu	Asp	Ala	Ala	Leu	Pro	Pro	-25	-20	-15	
Cys	Pro	Thr	Asn	Ala	Ala	Thr	Ala	Asp	Cys	Glu	Ile	Cys	Pro	Ala	Val	-10	-5	1	5
Lys	Arg	Asp	Val	Asp	Leu	Phe	Leu	Thr	Gly	Thr	Pro	Asp	Glu	Tyr	Val	10	15	20	
Glu	Gln	Val	Ala	Gln	Tyr	Lys	Ala	Leu	Pro	Val	Val	Leu	Glu	Asn	Ala	25	30	35	
Arg	Ile	Leu	Lys	Asn	Cys	Val	Asp	Ala	Lys	Met	Thr	Glu	Glu	Asp	Lys	40	45	50	
Glu	Asn	Ala	Leu	Ser	Leu	Leu	Asp	Lys	Ile	Tyr	Thr	Ser	Pro	Leu	Cys	55	60	65	70

(2) INFORMATION FOR SEQ ID NO:13:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 92 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val Phe Phe Ala
1 5 10 15

Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu Thr Lys Val
20 25 30

Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile Gln Asp Cys
35 40 45

Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly Leu Val Met
50 55 60

Thr Thr Ile Ser Ser Ser Lys Asp Cys Met Gly Glu Ala Val Gln Asn
65 70 75 80

Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
85 90

(2) INFORMATION FOR SEQ ID NO:14:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 90 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val Phe Phe
1 5 10 15

Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu Thr Lys
20 25 30

Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile Gln Asp
35 40 45

Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly Leu Val
50 55 60

Met Ile Ala Ile Asn Glu Tyr Cys Met Gly Glu Ala Val Gln Asn Thr
65 70 75

Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
80 85 90

(2) INFORMATION FOR SEQ ID NO:15:

- (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 51 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

Ser Leu Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys
1 5 10 15

Lys Ile Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu
 20 25 30

Asp Gly Leu Val Met Pro Ser Thr Asn Ile Ala Trp Val Lys Gln Phe
 35 40 45

Arg Thr Pro
 50

(2) INFORMATION FOR SEQ ID NO:16:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 82 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

- (iv) FEATURE:
 - (A) NAME/KEY: misc_feature
 - (B) LOCATION: 65
 - (D) OTHER INFORMATION: /label=Xaa is Ile or Thr

- (iv) FEATURE:
 - (A) NAME/KEY: misc_feature
 - (B) LOCATION: 66
 - (D) OTHER INFORMATION: /label=Xaa is Ala or Thr

- (iv) FEATURE:
 - (A) NAME/KEY: misc_feature
 - (B) LOCATION: 68
 - (D) OTHER INFORMATION: /label=Xaa is Asn or Ser

- (iv) FEATURE:
 - (A) NAME/KEY: misc_feature
 - (B) LOCATION: 69
 - (D) OTHER INFORMATION: /label=Xaa is Glu or Ser

- (iv) FEATURE:
 - (A) NAME/KEY: misc_feature

005524:0450
005524:0450

(B) LOCATION: 80

(D) OTHER INFORMATION: /label=Xaa is Ala or Thr

(iv) FEATURE:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

(2) INFORMATION FOR SEQ ID NO:17:

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

(2) INFORMATION FOR SEQ ID NO:18:

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile Leu Lys Asn Cys
1 5 10 15

Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu
20 25

(2) INFORMATION FOR SEQ ID NO:19:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 26 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
1 5 10 15

Thr Lys Val Asn Ala Thr Glu Pro Glu Arg
20 25

(2) INFORMATION FOR SEQ ID NO:20:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 19 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

Glu Glu Asp Lys Glu Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr
1 5 10 15

Ser Pro Leu

(2) INFORMATION FOR SEQ ID NO:21:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 19 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

Met	Gly	Glu	Ala	Val	Gln	Asn	Thr	Val	Glu	Asp	Leu	Lys	Leu	Asn	Thr
1				5				10					15		

Leu Gly Arg

(2) INFORMATION FOR SEQ ID NO:22:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 16 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

Glu	Glu	Asp	Lys	Glu	Asn	Ala	Leu	Ser	Leu	Leu	Asp	Lys	Ile	Tyr
1				5				10					15	

Thr

(2) INFORMATION FOR SEQ ID NO:23:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 14 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

Asn	Ala	Leu	Ser	Leu	Leu	Asp	Lys	Ile	Tyr	Thr	Ser	Pro	Leu
1				5					10				

(2) INFORMATION FOR SEQ ID NO:24:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 17 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

Phe	Tyr	Asp	Val	Phe	Phe	Ala	Val	Ala	Asn	Gly	Asn	Glu	Leu	Leu	Leu
1				5					10				15		

Asp

(2) INFORMATION FOR SEQ ID NO:25:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 18 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

Asn	Gly	Asn	Glu	Leu	Leu	Leu	Asp	Leu	Ser	Leu	Thr	Lys	Val	Asn	Ala
1				5					10					15	

Thr Glu

(2) INFORMATION FOR SEQ ID NO:26:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 18 amino acids
 - (B) TYPE: amino acid

005100:1225900

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

Ser	Leu	Thr	Lys	Val	Asn	Ala	Thr	Glu	Pro	Glu	Arg	Thr	Ala	Met	Lys
1				5					10					15	

Lys Ile

(2) INFORMATION FOR SEQ ID NO:27:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 17 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

Glu	Arg	Thr	Ala	Met	Lys	Lys	Ile	Gln	Asp	Cys	Tyr	Val	Glu	Asn	Gly
1				5					10					15	

Leu

(2) INFORMATION FOR SEQ ID NO:28:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

Gln	Asp	Cys	Tyr	Val	Glu	Asn	Gly	Leu	Ile	Ser	Arg	Val	Leu	Asp	Gly
1				5					10					15	

Leu Val

(2) INFORMATION FOR SEQ ID NO:29:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 20 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:29:

Ile Ser Arg Val Leu Asp Gly Leu Val Met Thr Thr Ile Ser Ser Ser
1 5 10 15

Lys Asp Cys Met
 20

(2) INFORMATION FOR SEQ ID NO:30:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 18 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

Ile Ser Arg Val Leu Asp Gly Leu Val Met Ile Ala Ile Asn Glu Asp
1 5 10 15

Cys Met

(2) INFORMATION FOR SEQ ID NO:31:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 30 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

005460-1825960

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:31:

Met Thr Thr Ile Ser Ser Ser Lys Asp Cys Met Gly Glu Ala Val Gln
1 5 10 15

Asn Thr Glu Val Glu Leu Asp Lys Leu Asn Thr Leu Gly Phe
 20 25 30

(2) INFORMATION FOR SEQ ID NO:32:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 28 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:32:

Met Ile Ala Ile Asn Glu Asp Cys Met Gly Glu Ala Val Gln Asn Thr
1 5 10 15

Glu Val Glu Leu Asp Lys Leu Asn Thr Leu Gly Phe
 20 25

(2) INFORMATION FOR SEQ ID NO:33:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 24 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:33:

TATCGATGAA ATTTGYCCWG CWGT

24

(2) INFORMATION FOR SEQ ID NO:34:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 19 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:34:

GCTCGAGRTC YTCYTCWGT

19

(2) INFORMATION FOR SEQ ID NO:35:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 31 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:35:

GGAATTCATC GATGTGAAGA GGGATCTATT C

31

(2) INFORMATION FOR SEQ ID NO:36:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 32 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:36:

GGATCGATGA ATTCTATTCC TGACGGGAAC CC

32

(2) INFORMATION FOR SEQ ID NO:37:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 20 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:37:

GGATTCTCTA GACTGCAGGT

20

(2) INFORMATION FOR SEQ ID NO:38:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:38:

GGAATTCTCT AGACTGCAGG T

21

(2) INFORMATION FOR SEQ ID NO:39:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 20 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:39:

GAYGARTAYG THGARCARGT

20

(2) INFORMATION FOR SEQ ID NO:40:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 27 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:40:

CGGAATTCAA RATGGCNGAR ACDTGYC

27

(2) INFORMATION FOR SEQ ID NO:41:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 33 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:41:

CGGGCTGCAG TARCARTCYT GNATYTTYTT CAT

33

(2) INFORMATION FOR SEQ ID NO:42:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 8 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:42:

Met Lys Lys Ile Gln Asp Cys Tyr
1 5

(2) INFORMATION FOR SEQ ID NO:43:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 31 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:43:

GGATCGATGA ATTCGGTGGC CAATGGAAAT G

31

(2) INFORMATION FOR SEQ ID NO:44:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:44:

ATTACTGTTG GACTTGTCCC T

21

(2) INFORMATION FOR SEQ ID NO:45:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 6 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:45:

Leu Leu Leu Asp Leu Ser
1 5

(2) INFORMATION FOR SEQ ID NO:46:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 30 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:46:

GGGTCTAGAG GTACCGTCCG ATCGATCATT

30

(2) INFORMATION FOR SEQ ID NO:47:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 13 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:47:

AATGATCGAT GCT

13

(2) INFORMATION FOR SEQ ID NO:48:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 20 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:48:

GGGTCTAGAG GTACCGTCCG

20

(2) INFORMATION FOR SEQ ID NO:49:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 35 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:49:

CGGGCTCGAG CTGCAGCTGT TCTCTCTGGT TCAGT

35

(2) INFORMATION FOR SEQ ID NO:50:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 6 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:50:

Thr Glu Pro Glu Arg Thr
1 5

(2) INFORMATION FOR SEQ ID NO:51:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 29 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:51:

GGGCTGCAGA TTCTAGTCAG CCTGATTGA

29

(2) INFORMATION FOR SEQ ID NO:52:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 33 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:52:

GGGCTCGAGC TGCAGTTCTT CAGTATTCTG GCA

33

(2) INFORMATION FOR SEQ ID NO:53:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 6 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:53:

Ala Arg Ile Leu Lys Asn
1 5

(2) INFORMATION FOR SEQ ID NO:54:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 17 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:54:

Glu	Ile	Thr	Pro	Ala	Val	Lys	Arg	Asp	Val	Asp	Leu	Phe	Leu	Thr	Gly
1				5					10					15	

Thr

(2) INFORMATION FOR SEQ ID NO:55:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 17 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:55:

Asp	Val	Asp	Leu	Phe	Leu	Thr	Gly	Thr	Pro	Asp	Glu	Tyr	Val	Glu	Gln
1				5					10					15	

Val

(2) INFORMATION FOR SEQ ID NO:56:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 19 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:56:

Asn	Ala	Arg	Ile	Leu	Lys	Asn	Cys	Val	Asp	Ala	Lys	Met	Thr	Glu	Glu
1				5					10					15	

Asp Lys Glu

(2) INFORMATION FOR SEQ ID NO:57:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 27 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:57:

Leu Leu Leu Asp Leu Ser Leu Thr Lys Val Asn Ala Thr Glu Pro Glu
1 5 10 15

Arg Thr Ala Met Lys Lys Ile Asp Gln Asp Cys
 20 25

(2) INFORMATION FOR SEQ ID NO:58:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 27 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:58:

GTCCACGGAC ACAAGTGC GA TATCACC

27

(2) INFORMATION FOR SEQ ID NO:59:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 27 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:59:

GTTGGCTTCC TTCACAGGAC AGGAATT

27

(2) INFORMATION FOR SEQ ID NO:60:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 18 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:60:

Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val Phe Phe Ala
1 5 10 15

Val Ala

(2) INFORMATION FOR SEQ ID NO:61:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 27 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 10..27

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:61:

GGGGGATCC AAA GCT CTG CCG GTT GTT
Lys Ala Leu Pro Val Val
1 5

27

(2) INFORMATION FOR SEQ ID NO:62:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 6 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:62:

Lys Ala Leu Pro Val Val

(2) INFORMATION FOR SEQ ID NO:63:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 90 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

- (ix) FEATURE:
 (A) NAME/KEY: CDS
 (B) LOCATION: 10..90

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:63:

GGGGGATCC AAA GCT CTG CCG GTT GTT CTG GAA AAC GCT CGT ATC CTG	48
Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile Leu	
1 5 10	
AAA AAC TGC GTT GAC GCT AAA ATG ACC GAA GAA GAC AAA GAA	90
Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu	
15 20 25	

(2) INFORMATION FOR SEQ ID NO:64:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 27 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:64:

Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile Leu Lys Asn Cys	
1 5 10 15	
Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu	
20 25	

(2) INFORMATION FOR SEQ ID NO:65:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 63 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:65:

CAGAGACAGG TCCAGCAGCA GTTCGTTACC GTTAGCAACA GCGAAGAATT CTTTGTCTTC 60
TTC 63

(2) INFORMATION FOR SEQ ID NO:66:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 21 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:66:

Glu Glu Asp Lys Glu Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu
1 5 10 15
Leu Asp Leu Ser Leu
20

(2) INFORMATION FOR SEQ ID NO:67:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 45 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:
(A) NAME/KEY: CDS
(B) LOCATION: 1..45

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:67:

CTG GAC CTG TCT CTG ACC AAA GTT AAC GCT ACC GAA CCG GAA CGT 45
Leu Asp Leu Ser Leu Thr Lys Val Asn Ala Thr Glu Pro Glu Arg
1 5 10 15

(2) INFORMATION FOR SEQ ID NO:68:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 15 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:68:

Leu Asp Leu Ser Leu Thr Lys Val Asn Ala Thr Glu Pro Glu Arg
1 5 10 15

(2) INFORMATION FOR SEQ ID NO:69:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 54 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:69:

GTCCGGGGTA CCGGTCAGGA ACAGGTCAAC GTCACGTTTA CGTTCCGGTT CGGT

54

(2) INFORMATION FOR SEQ ID NO:70:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 18 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:70:

Thr Glu Pro Glu Arg Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr
1 5 10 15

Pro Asp

(2) INFORMATION FOR SEQ ID NO:71:

- (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 89 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..63

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:71:

ACC GGT ACC CCG GAC GAA TAC GTT GAA CAG GTT GCT CAG TAC AAA GCT	48
Thr Gly Thr Pro Asp Glu Tyr Val Glu Gln Val Ala Gln Tyr Lys Ala	
1 5 10 15	
CTG CCG GTT TAG TAGTCTAGAC TGCAGAAGCT TGGATCCCC	89
Leu Pro Val	

(2) INFORMATION FOR SEQ ID NO:72:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:72:

Thr Gly Thr Pro Asp Glu Tyr Val Glu Gln Val Ala Gln Tyr Lys Ala
1 5 10 15
Leu Pro Val

(2) INFORMATION FOR SEQ ID NO:73:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 44 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:73:

(2) INFORMATION FOR SEQ ID NO:74:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 4 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide
- (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:74:

Ala Leu Pro Val
1

(2) INFORMATION FOR SEQ ID NO:75:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 41 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: cDNA
- (ix) FEATURE:
 - (A) NAME/KEY: CDS
 - (B) LOCATION: 9..41

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:75:

GGGGATCC GAA GAA GAC AAA GAA AAC GCT CTG TCT CTG CTG
Glu Glu Asp Lys Glu Asn Ala Leu Ser Leu Leu
1 5 10

41

(2) INFORMATION FOR SEQ ID NO:76:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 11 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:76:

Glu Glu Asp Lys Glu Asn Ala Leu Ser Leu Leu
 1 5 10

(2) INFORMATION FOR SEQ ID NO:77:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 60 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:77:

TTCCAGAACA ACCGGCAGAG CTTTCAGCGG AGAGGTGTAG ATTTTGTCCA GCAGAGACAG 60

(2) INFORMATION FOR SEQ ID NO:78:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 20 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:78:

Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Lys Ala Leu Pro
 1 5 10 15

Val Val Leu Glu
 20

(2) INFORMATION FOR SEQ ID NO:79:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 54 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:79:

TTCAACGGTG TTCTGAACAG CTTACCCCAT AACCGGCAGA GCTTTGTACT GAGC

54

(2) INFORMATION FOR SEQ ID NO:80:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:80:

Ala Gln Tyr Lys Ala Leu Pro Val Met Gly Glu Ala Val Gln Asn Thr
1 5 10 15
Val Glu

(2) INFORMATION FOR SEQ ID NO:81:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 65 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..42

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:81:

CAG AAC ACC GTT GAA GAC CTG AAA CTG AAC ACC CTG GGT CGT
Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
1 5 10

42

TGAATGTAAC TGCAGAATTC CCC

65

(2) INFORMATION FOR SEQ ID NO:82:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 14 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:82:

Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
1. 5 10

(2) INFORMATION FOR SEQ ID NO:83:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 20 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 9..20

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:83:

GGGGATCC GAA GAA GAC AAA
Glu Glu Asp Lys
1

20

(2) INFORMATION FOR SEQ ID NO:84:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 4 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:84:

Glu Glu Asp Lys
1

(2) INFORMATION FOR SEQ ID NO:85:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 35 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:85:

GGGGAATTCT GCAGTTACAT TCATCTCCCC AAAGT

35

(2) INFORMATION FOR SEQ ID NO:86:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 4 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:86:

Thr Leu Gly Arg

1

(2) INFORMATION FOR SEQ ID NO:87:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 6 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:87:

Leu Val Pro Arg Gly Ser

1

5

(2) INFORMATION FOR SEQ ID NO:88:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 10 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:88:

Met Gly His His His His His Glu Phe
1 5 10

(2) INFORMATION FOR SEQ ID NO:89:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 6 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:89:

GAATTC

6

(2) INFORMATION FOR SEQ ID NO:90:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 6 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:90:

GGATCC

6

(2) INFORMATION FOR SEQ ID NO:91:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 14 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:91:

Met Gly His His His His His His Leu Val Pro Arg Gly Ser

(2) INFORMATION FOR SEQ ID NO:92:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 7 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:92:

Lys Met Ala Glu Thr Cys Pro
1 5

(2) INFORMATION FOR SEQ ID NO:93:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 5 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:93:

Val Ala Asn Gly Asn
1 5

(2) INFORMATION FOR SEQ ID NO:94:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 36 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:94:

ATTGGCCACC GCAAAAAATA CAGGTAGTGC TTTGTA

36

(2) INFORMATION FOR SEQ ID NO:95:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 28 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:95:

TAGTGCCTTT TCTCTCTGGT TCAGTAGC

28

(2) INFORMATION FOR SEQ ID NO:96:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 29 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:96:

GGGGATCCTT ACTCCTTATC CTCTTCTGT

29

(2) INFORMATION FOR SEQ ID NO:97:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 36 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:97:

TAGGTCAACA TCCCTCTTCT CTTATCCTC TTCTGT

36

(2) INFORMATION FOR SEQ ID NO:98:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 27 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:98:

CGCAAAAAAT ACAGGTAGTG CTTTGTA

27

(2) INFORMATION FOR SEQ ID NO:99:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 29 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:99:

GGGGATCCTT ATCTCTCTGG TTCAGTAGC

29

(2) INFORMATION FOR SEQ ID NO:100:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 39 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:100:

TAGGTCAACA TCCCTCTTTC TCTCTGGTTC AGTAGCATT

39

[illegible]

(D) TOPOLOGY: linear

(iv) ANTI-SENSE: YES

32

(D) TOPOLOGY: linear

(B) LOCATION: 1..288

ACC GAA CCG GAA CGT AAA CGT GAC GTT GAC CTG TTC CTG ACC GGT ACC 240
Thr Glu Pro Glu Arg Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr

65

70

75

80

CCG GAC GAA TAC GTT GAA CAG GTT GCT CAG TAC AAA GCT CTG CCG GTT
 Pro Asp Glu Tyr Val Glu Gln Val Ala Gln Tyr Lys Ala Leu Pro Val
 85 90 95

288

(2) INFORMATION FOR SEQ ID NO:103:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 96 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:103:

Met Gly His His His His His His Glu Phe Leu Val Pro Arg Gly Ser
 1 5 10 15
 Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile Leu Lys Asn Cys
 20 25 30
 Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu Phe Phe Ala Val Ala
 35 40 45
 Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu Thr Lys Val Asn Ala
 50 55 60
 Thr Glu Pro Glu Arg Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr
 65 70 75 80
 Pro Asp Glu Tyr Val Glu Gln Val Ala Gln Tyr Lys Ala Leu Pro Val
 85 90 95